

Electronic Meeting, June 28 - July 2, 2021

Agenda Item: 4.2

Source: Fujitsu

Title: Email discussion summary for [RAN-R18-WS-non-eMBB-Fujitsu]

1 Introduction

This discussion thread covers two papers:

[1] RWS-210288 UPTEC: Ultra-precision time engineered communications

[2] RWS-210290 Views on Rel-18 Sidelink

2 General Comments

2.1 1st round of general comments

Feedback Form 1: 1st round of general comments

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2.2 1st round of answers

Feedback Form 2: 1st round of general answers

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2.3 2nd round of general comments

Feedback Form 3: 2nd round of general comments

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2.4 2nd round of answers

To be provided later.

3 Comments and Questions to the Tdoc [RWS-210288]

For your convenience, the proposals are captured as following:

- **C-plane enhancements include:**
 - Support Coordination of multiple Radio Bearer (CRB) by
 - (1) Specifying a method to address/avoid potential RAN-NAS interactions
 - (2) Specifying radio bearer structure to enable CRB
 - (3) Specifying a method of fast control of CRB

- **U-plane enhancements include:**
 - Support real-time traffic delivery including aperiodic deterministic traffic by
 - (1) Specifying PDCP distribution to always select best leg for real-time timeliness delivery
 - (2) Specifying a scheduling request procedure to trigger real-time timeliness delivery
 - (3) Specifying a radio resource allocation to boost PDCP distribution

Figure 1: Proposals in RWS-210888

3.1 1st round of questions and comments

Feedback Form 4: 1st round of questions and comments to RWS-210288

1 – Sony Europe B.V.

On proposals for U-plane enhancements (slide 10), it is proposed to specifying SR procedures to trigger real time timeliness delivery. The current (Rel-15, Rel-16, Rel-17) SR can be associated to a service, can you clarify what is lacking in Rel-17 & Rel- 16 SR, in order to support real time timeliness delivery?

2 – Beijing Xiaomi Mobile Software

Thanks for the contribution.

We are interested in this use case of negotiation/coordination procedures between multiple streams. We had a paper (RWS-210251) for multi-modality services (e.g., video, audio media and haptic data) which targeting on coordinated parallel transmission.

Some questions to ask:

- 1) Is it the coordination of multiple streams within a single UE or across multiple UEs?
- 2) Regarding to the enhancement of CP, it is not clear how the CRB works and how this CRB helps coordination of multiple streams?

- (1) Specifying a method to address/avoid potential RAN NAS interactions

How to enhance the AS/NAS interactions? Do you mean application awareness in RAN or RAN awareness in application?

- (2) Specifying radio bearer structure to enable CRB

- Do you mean a new structure?

- (3) Specifying a method of fast control of CRB

How to achieve fast control?

3) Regarding to the enhancement of UP, is the purpose to enhance the scheduling (e.g., trigger real-time timeliness delivery) to help reception timing adjustment for coordination of multiple streams?

3 – Intel Corporation (UK) Ltd

Q1: Do you expect any RAN1 impact from UPTEC? If yes, what is the potential impact?

Q2: Could you clarify if there are any related SA1 requirements regarding the Coordination of multiple Radio Bearer (CRB)?

4 – Nokia Germany

Overall question on UPTEC proposed here: Are there any (SA related) service requirements in place already, or is this related to any ongoing SA1 / SA2 work in Rel-17 – or is this related to some of the SA SI proposals for Rel-18?

Why is this important to coordinate multiple radio bearers ? Application layer should be able to sort it out?

For uplink, PDCP distribution (RLC re-selection) is done by the UE itself? What enables faster communication on one leg comparing to the other (any resource isolation among these legs)?

5 – Sony Europe B.V.

Sorry for multiple posts. We have another question on Aperiodic Deterministic Traffic:

On slide 4, it is mentioned that CG is not suitable for Aperiodic Deterministic Traffic. Can you clarify why existing CG and DG cannot handle Aperiodic Deterministic Traffic?

6 – Qualcomm Incorporated

The proposals could have impact to SA2, given the changes being proposed to the bearer framework. To what extent do you think SA2 has to be involved in this work?

3.2 1st round of answers

Feedback Form 5: 1st round of answers to RWS-210288

1 – Fujitsu Limited

1 – Sony Europe B.V.

(1) On proposals for U-plane enhancements (slide 10), it is proposed to specifying SR procedures to trigger real time timeliness delivery. The current (Rel-15, Rel-16, Rel-17) SR can be associated to a service, can you clarify what is lacking in Rel-17 & Rel- 16 SR, in order to support real time timeliness delivery?

(2) We have another question on Aperiodic Deterministic Traffic: On slide 4, it is mentioned that CG is not suitable for Aperiodic Deterministic Traffic. Can you clarify why existing CG and DG cannot handle Aperiodic Deterministic Traffic?

Answers to Sony Europe B.V.:

(1) There are two types of procedures. The one is SR PUCCH procedure. In the current (Rel-15/16/17) SR PUCCH procedure, there are three steps at UE side composed of SR transmission, UL grant reception, and PUSCH transmission, which could cause latency. Such a latency would be reduced. The other is 2-step RA procedure. In the current (Rel-16/17) 2-step RA procedure, contention-free 2-step RA procedure is only limited to handover. Applicability to other cases where only contention-based 2-step RA procedure is permitted would be considered to reduce latency.

(2) On slide 4, the bullet mentions only the problem with CG for Aperiodic Deterministic Traffic (ADT). CG timing may not always align with the ADT arrival timing and such a timing mismatch problem is the intention of slide 4. Indeed, overprovisioning of CG resource can address the timing mismatch problem, but it may not good from resource efficiency perspective. Then if DG is considered for ADT transmission, latency need to be reduced due to SR procedure latency, which would be achieved by enhanced SR procedure as we mentioned in above (1).

2 – Beijing Xiaomi Mobile Software

Thanks for the contribution.

We are interested in this use case of negotiation/coordination procedures between multiple streams. We had a paper (RWS-210251) for multi-modality services (e.g., video, audio media and haptic data) which targeting on coordinated parallel transmission.

Some questions to ask:

- 1) Is it the coordination of multiple streams within a single UE or across multiple UEs?
- 2) Regarding to the enhancement of CP, it is not clear how the CRB works and how this CRB helps coordination of multiple streams?

•(1) Specifying a method to address/avoid potential RAN NAS interactions

How to enhance the AS/NAS interactions? Do you mean application awareness in RAN or RAN awareness in application?

•(2) Specifying radio bearer structure to enable CRB

Do you mean a new structure?

•(3) Specifying a method of fast control of CRB

How to achieve fast control?

- 3) Regarding to the enhancement of UP, is the purpose to enhance the scheduling (e.g., trigger real-time timeliness delivery) to help reception timing adjustment for coordination of multiple streams?

Answers to Beijing Xiaomi Mobile Software:

We are also interested in RWS-210251.

(1) We would consider both within-single-UE scenario and across-multiple UEs scenarios. From standardization perspective, we think that the within-single-UE scenario may have less impact to overall RAN impact since gNB only cares about flows within one UE.

(2) CRB is a virtualization of radio bearers, where multiple grouped radio bearers are coordinated and act as if it is one bearer. The main point is timing synchronization among packets of the multiple radio bearers and such synchronized packets are delivered to upper layer and finally application layer. As such, application layer can process the synchronized packets, for example which is essential for rendering in case of XR. Some think that such a packet synchronization can also be done in application layer by using jitter buffer, but we would stress here that what's important is that lower layer (e.g. RAN) in principle should do that to provide precise QoS with application layers. This intention is also shown in Slide 7 on "Layering cornerstone".

(3) For RAN-NAS interaction, it would be application awareness in RAN. For example, it could be QoS flow or PDU session information. With such information, RAN can establish CRB and perform proper packet scheduling.

(4) On the structure, no, we think that CRB is just a virtualization of radio bearers, so no new structure (e.g. new protocol layer) is considered.

(5) On the fast control, it would be considered case by case. The cases include group remapping, handover, and so on.

(6) On the scheduling enhancement, the intention is SR procedure enhancement. There are two types of procedures. The one is SR PUCCH procedure. In the current (Rel-15/16/17) SR PUCCH procedure, there are three steps at UE side composed of SR transmission, UL grant reception, and PUSCH transmission. The three steps could cause latency and some latency reduction mechanism would be considered. In the current (Rel-16/17) 2-step RA procedure, contention-free 2-step RA procedure is only limited to handover. Applicability to other cases where only contention-based 2-step RA procedure is permitted would be considered to reduce latency.

3 – Intel Corporation (UK) Ltd

Q1: Do you expect any RAN1 impact from UPTEC? If yes, what is the potential impact?

Q2: Could you clarify if there are any related SA1 requirements regarding the Coordination of multiple Radio Bearer (CRB)?

Answers to Intel Corporation (UK) Ltd:

We are also interested in RWS-210251.

(1) There could be RAN1 impact depending on what enhancement would be studied. According to P10 (U-plane enhancement), PHY structure may need to be discussed in RAN1. This proposed structure is aiming at good leg selection, so that PHY structure enhancement could be also considered. For example, each leg can be mapped to one CC, but multiple BWPs can be activated and a good BWP among all activated BWPs can be selected. Another potential impact would be SR procedure enhancement. In the current SR PUCCH procedure, there are three steps at UE side composed of SR transmission, UL grant reception, and PUSCH transmission. The three steps could cause latency and some latency reduction mechanism would be considered. In addition, applicability of contention-free 2-step RA procedure to other cases where only contention-based 2-step RACH is permitted would be considered to reduce latency. If this is the case, there may be RAN1 impact.

(2) There is no direct requirements in SA1, but one relevant requirement has been added in Section 7.6 of TS22.261 in Rel-17 (high data rate and low latency), where audio-video synchronization is mentioned. In

addition, one relevant use case has been added in Section 5.1 of TR22.847 in Rel-18, which is “Immersive Multi-modal Virtual Reality application” and new KPI is captured. From flow synchronization perspective, the proposed enhancement of CRB is somewhat relevant to these requirements and KPIs.

4 – Nokia Germany

(1) Overall question on UPTEC proposed here: Are there any (SA related) service requirements in place already, or is this related to any ongoing SA1 / SA2 work in Rel-17 – or is this related to some of the SA SI proposals for Rel-18?

(2) Why is this important to coordinate multiple radio bearers ? Application layer should be able to sort it out?

(3) For uplink, PDCP distribution (RLC re-selection) is done by the UE itself? What enables faster communication on one leg comparing to the other (any resource isolation among these legs)?

Answers to Nokia Germany:

(1) There is no direct relevance to SA, but one relevant requirement has been added in Section 7.6 of TS22.261 in Rel-17 (high data rate and low latency), where audio-video synchronization is mentioned. In addition, one relevant use case has been added in Section 5.1 of TR22.847 in Rel-18, which is “Immersive Multi-modal Virtual Reality application” and new KPI is captured. From flow synchronization perspective, the proposed enhancement of CRB is somewhat relevant to these requirements and KPIs.

(2) Yes, it could be also possible that packet synchronization can also be done in application layer by using jitter buffer, but we would stress here that what’s important is that lower layer (e.g. RAN) in principle should do that to provide precise QoS with application layers. This intention is also shown in Slide 7 on “Layering cornerstone”.

(3) Both reactive (based on some NW instruction) and proactive (UE autonomous leg selection) are possible. The leg selection and faster communication could be based on PHY layer condition e.g. good radio condition and short SCS. The other way could be based on LCH parameters e.g. short max-PUSCH duration. On the PHY resources, each leg can be mapped to one CC, but multiple BWPs can be activated and a good BWP among all activated BWPs can be selected.

5 – Qualcomm Incorporated

The proposals could have impact to SA2, given the changes being proposed to the bearer framework. To what extent do you think SA2 has to be involved in this work?

Answers to Qualcomm:

The proposal of CRB could have impact to SA2 while we consider that the CRB itself would be an enhancement of RAN-level bearer handling. The synchronization among QoS flows is already somewhat considered in SA2 since, for example, one relevant requirement has been added in Section 7.6 of TS22.261 in Rel-17 (high data rate and low latency), where audio-video synchronization is mentioned. We would achieve it with minimum impact to SA2. For example, RAN would obtain information from NAS, which could be QoS flow and PDU session information, and the QoS information, traffic characteristics, and so on. Based on such information, RAN could establish CRB over which carry on synchronous data delivery.

3.3 2nd round of questions and comments

Feedback Form 6: 2nd round of questions and comments

1 – Beijing Xiaomi Mobile Software

Thanks for the response!

Comments :

1) We agree that single-UE scenario can be considered first. Is that OK if the UE devices belongs to different end users as long as they are under the same cell/gNB?

2) Not quite sure about “lower layer (e.g. RAN) in principle should do that to provide precise QoS with application layers. This intention is also shown in Slide 7 on “Layering cornerstone”.”

What you mean is RAN can do better than application layer’ buffer jitter, such reduce latency (e.g., using contention-free 2-step RA)?

3) For the good leg selection, why multiple BWPs can be activated? Is one active BWP for one cell still works?

4) The impact to SA2: “RAN would obtain information from NAS, which could be QoS flow and PDU session information, and the QoS information, traffic characteristics, and so on. Based on such information, RAN could establish CRB over which carry on synchronous data delivery.

Do you think the current Qos is enough?

2 – Nokia Germany

Thanks for the 1st round answers. Still a follow-up on two issues from our side:

We still have questions about coordination among radio bearers. Could you provide a more detailed example about its use case and benefits?

And on the RLC re-selection:

1. If this is for real-time delivery, the gNB should map this DRB to appropriate resource that gives the best latency performance anyway, in what scenarios the UE needs to switch by itself?

2. Do you agree that some restriction about which RLC to choose should be guided by gNB first? We think it may be risky if we allow the UE to select “any” RLC dynamically.

3. For real-time delivery, most likely configured grant should be used. From this perspective do we really need to enhance scheduling request?

4. Could you please provide more details about specification for “resource allocation”?

3 – HuaWei Technologies Co.

We have some interest in your proposals. Do you think the coordination of multiple streams can be considered in the scope of XR in Rel-18, and this needs coordination with SA2/SA4?

Feedback Form 7:

1 – Fujitsu Limited

1 – Beijing Xiaomi Mobile Software

Thanks for the response!

Comments :

1) We agree that single-UE scenario can be considered first. Is that OK if the UE devices belongs to different end users as long as they are under the same cell/gNB?

2) Not quite sure about “lower layer (e.g. RAN) in principle should do that to provide precise QoS with application layers. This intention is also shown in Slide 7 on “Layering cornerstone”.”

What you mean is RAN can do better than application layer’ buffer jitter, such reduce latency (e.g., using contention-free 2-step RA)?

3) For the good leg selection, why multiple BWPs can be activated? Is one active BWP for one cell still works?

4) The impact to SA2: “RAN would obtain information from NAS, which could be QoS flow and PDU session information, and the QoS information, traffic characteristics, and so on. Based on such information, RAN could establish CRB over which carry on synchronous data delivery.

Do you think the current Qos is enough?

Answers to Beijing Xiaomi Mobile Software:

(1) Yes, it could be the scope of our proposals.

(2) Yes, what we are considering here is very basic principle in communication system, which is layering structure. In this principle, lower layers must provide services to higher layers in a way that the service requirement is met. Based on this principle, RAN (lower layer) should take actions e.g. bearer coordination rather than APP (high layer), otherwise APP may over-deploy jitter buffer, stream coordination. Note that developing such a jitter buffer and bearer control is becoming burden to APP developer.

(3) Yes, one active BWP for one cell still work. Let me try to show an example case where multiple BWPs bring benefit. There is a case that a data is delivered to a leg that have good condition e.g. non congested and best MPD (Max PUSCH duration). On top of that, the data can further select best BWP among activated BWPs, which is good from radio performance perspective.

(4) This is the proposal that we need to study what interaction is needed between AS and NAS. For CRB, it is good to study what kind of stream coordination information is needed. In our view, in case of stream coordination of UE devices belongs to different users, such a coordination information e.g. QoS flows information that need to coordinate seems to be unavailable to gNB according to the current 3GPP specifications.

2 – Nokia Germany

Thanks for the 1st round answers. Still a follow-up on two issues from our side:

We still have questions about coordination among radio bearers. Could you provide a more detailed example about its use case and benefits?

And on the RLC re-selection:

1. If this is for real-time delivery, the gNB should map this DRB to appropriate resource that gives the best latency performance anyway, in what scenarios the UE needs to switch by itself?

2. Do you agree that some restriction about which RLC to choose should be guided by gNB first? We think it may be risky if we allow the UE to select “any” RLC dynamically.
3. For real-time delivery, most likely configured grant should be used. From this perspective do we really need to enhance scheduling request?
4. Could you please provide more details about specification for “resource allocation”?

Answers to Nokia Germany

For the bearer coordination: Let us explain details according to audio-video synchronization according to the 1st round answer. TS22.261 mentions that the separate handling of the audio and video component in VR audio-video synchronization. Then we have a case in mind that video stream and audio stream are separately generated and delivered by different flows, one for video and other is for audio. In such a case, each flow is better to be synchronized in order to avoid negative impact on the user experience as mentioned in TS22.261. It is mentioned that, in the best case of relative latency, audio can be delayed or advanced within 5ms. To meet such a low relative latency, we think that the relative latency is better to be minimized, especially in Uu interface and gNB since it is in general erroneous compared to wired link. For the uplink, if the video packet is ACKed but audio packet is NACKed, the video stream would be still buffered until audio packet is successfully received, by which the relative latency becomes 0ms. For the downlink, such a minimized latency may bring benefit to the UE from the perspective of buttery saving since rendering by the GPU equipped in UE can be done immediately without waiting for late packet arrival.

Having said that, we would be open to discuss if there are any use cases of bearer coordination and the necessity of the coordination with SA2 or SA4.

For the RLC re-selection:

(1) OK, we can show a detailed example. We also think that gNB can control PDCP duplication and RLC reselection in most cases. Having said that, what we have in mind is uplink. There are also cases that the latency performance becomes (temporally) bad and (consecutive) retransmission occurs. It seems to be good that UE switches to good leg with good latency performance. We also note that the leg selection includes autonomous PDCP duplication, where PDCP duplicates are distributed by the UE leg selection.

(2) Yes, we agree. The gNB is better to pre-configure something to control the RLC re-selection for the UE.

(3) We also think that CG may be dominant resource, but DG could be also useful in case of sudden data arrival at a time moment and there are no CG resources at the time moment. From this perspective, enhanced SR procedure is good to study for the data transmission by DG.

(4) The intention is PHY layer structure. For example, each leg may have mapping restriction so that each leg could be only mapped to specific SCS (Sub Carrier Spacing), CC (Component Carrier), or BWP (Bandwidth Part). Alternatively, each leg may have limited restriction so that each leg could be mapped to any SCS, CC, or BWP. Regarding BWP, it may be also good to study if multiple BWPs can be activated at the same time (In Rel-15, only one BWP can be activated).

3 – HuaWei Technologies Co., Ltd

We have some interest in your proposals. Do you think the coordination of multiple streams can be considered in the scope of XR in Rel-18, and this needs coordination with SA2/SA4?

Answers to HuaWei Technologies Co., Ltd

Yes, the coordination of multiple streams can be also considered in the scope of XR in Rel-18 since such a coordination may be needed for XR. The coordination with SA2 and SA4 may be needed depending

on RAN WGs discussions. For example, details of QoS information (e.g. which QoS flows need to be coordinated) and QoS flow control procedure (if needed) can be discussed with SA2. RAN also can coordinate with SA4, which can study coding aspect. Some of our proposals may need to coordinate with SA4, which include network rendering and buffer synchronization aspect. You may be aware that SA4 is also developing XR related TR 26.928 and such aspect is also mentioned.

4 Comments and Questions to the Tdoc [RWS-210290]

For your convenience, the proposals are captured as following:

Proposal 1: For Rel-18 sidelink (RAN1-led), specify the following:↵

■ SL-U (FR1 is prioritized)↵

- Channel access, e.g., LBT, COT.↵
- Resource allocation, e.g., impact on existing mode 1 and mode 2.↵
- Physical layer structure, e.g., non-slot with flexible starting position, potentially interlaced channels/signals.↵
- Physical layer procedure, e.g., SL HARQ-ACK to cope with LBT failure.↵
- Synchronization, e.g., S-SSB to cope with LBT failure.↵
- Carrier aggregation, e.g., aggregating both licensed and unlicensed carriers.↵

Proposal 2: For Rel-18 sidelink (RAN2-led), specify the following:↵

■ SL relay enhancements↵

- UE-to-UE relay↵
 - Adaptation layer design.↵
 - QoS management.↵
 - Relay discovery, selection and reselection.↵
 - Control plane procedure, e.g., connection establishment/reconfiguration/release, SI, paging, mobility measurement configuration and reporting.↵
- Multi-hop support↵
- Multi-path support↵
 - Relay UEs selection and reselection.↵
 - Path setup, selection and aggregation.↵
- Group mobility↵
 - Signaling procedure, e.g., for intra-gNB and inter-gNB scenarios.↵
 - Service continuity.↵

Figure 2: Proposals in RWS-210290

4.1 1st round of questions and comments

**Feedback Form 8: 1st round of questions and comments to
RWS-210290**

1 – HuaWei Technologies Co.

1. We have similar understanding on having multi-path support, and in our understanding for UL this mainly requires the gNB to aggregate the data from multi-path (including direct and indirect path), is it consistent with your proposal?
2. In Rel-17 we have not yet supported U2U relay and we think it may be possible to have a fundamental U2U function for Rel-18, and do you think we can start from single hop on U2U?

2 – Intel Corporation (UK) Ltd

Q1: Our understanding that V2X use case is considered as one of the main use cases for SL-U work. We are not sure that it is the best option/motivation for V2X evolution, however SL-U framework can be beneficial for sidelink aided I-IoT scenarios. What is your consideration on SL-U support for I-IOT scenarios?

3 – Guangdong OPPO Mobile Telecom.

For U2U relay, why SI delivery needs to be considered - we assume out-of-coverage does not need this, and for partial-/in-coverage case, why the source UE needs to follow the SIB of target UE?

4 – InterDigital Communications

On slide 9, enhancements for U2U relay include aspects like connection establishment, paging, SI. Mobility measurements, etc. Can you please explain why you think these applicable to U2U relay? Is the intent that they are studied for the applicability if U2U relay in the context of multi-hop U2N relay? Do you suggest that both U2U and multi-hop is studied in parallel?

5 – CATT

For U2U relay, what specific objectives do you envision RAN1's involvement ?

4.2 1st round of answers

Feedback Form 9: 1st round of answers

1 – Fujitsu Limited

1 – HuaWei Technologies Co.

1. We have similar understanding on having multi-path support, and in our understanding for UL this mainly requires the gNB to aggregate the data from multi-path (including direct and indirect path), is it consistent with your proposal?
2. In Rel-17 we have not yet supported U2U relay and we think it may be possible to have a fundamental U2U function for Rel-18, and do you think we can start from single hop on U2U?

Answers to HuaWei Technologies Co.:

1. Yes, it is consistent with my proposal.
2. We can start from single-hop U2U. On the other hand, the protocol stack design should be future proof, i.e., support multi-hop U2U later.

2 – Intel Corporation (UK) Ltd

Q1: Our understanding that V2X use case is considered as one of the main use cases for SL-U work. We are not sure that it is the best option/motivation for V2X evolution, however SL-U framework can be beneficial for sidelink aided I-IoT scenarios. What is your consideration on SL-U support for I-IOT scenarios?

Answers to Intel Corporation (UK) Ltd:

We think IIoT can be also one of the use cases to use SL-U. E.g., a factory may deploy its own network based on SL-U. We are open to SL-U for IIoT and other potential use cases for SL-U.

3 – Guangdong OPPO Mobile Telecom.

For U2U relay, why SI delivery needs to be considered - we assume out-of-coverage does not need this, and for partial-/in-coverage case, why the source UE needs to follow the SIB of target UE?

Answers to Guangdong OPPO Mobile Telecom.:

For partial coverage scenario, we assume that some SI messages, such as ETWS/CMAS notifications, can be delivered from the UE in-coverage to the UE out-of-coverage via the relay UE.

4 – InterDigital Communications

On slide 9, enhancements for U2U relay include aspects like connection establishment, paging, SI. Mobility measurements, etc. Can you please explain why you think these applicable to U2U relay? Is the intent that they are studied for the applicability if U2U relay in the context of multi-hop U2N relay? Do you suggest that both U2U and multi-hop is studied in parallel?

Answers to InterDigital Communications:

For U2U, 2 remote UEs may need to maintain their PC5 connection for unicast, so the connection establishment/reconfiguration/release may be applicable.

For SI, please also find the reply to OPPO's question.

For paging, maybe it is more applicable for U2U in multi-hop U2N relay scenario.

The mobility measurements are related to relay (re)selection. We assume that the measurement configuration and reporting may be needed for both remote UEs to change their relay.

We can study multi-hop U2N. And for U2U, we can start with single hop.

5 – CATT

For U2U relay, what specific objectives do you envision RAN1's involvement ?

Answers to CATT:

Currently we have not identified the objectives with RAN1's involvement.

4.3 2nd round of questions and comments

Feedback Form 10: 2nd round of questions and comments

1 – HuaWei Technologies Co.

Thanks for the answer. We have some extra questions on sidelink enhancements as below:

Q1: What power control enh do you think is the most important?

Q2: Would the SL CA mentioned under SL-unlicensed also be applicable as a feature to non-unlicensed bands? Intra- and inter-band?

4.4 2nd round of answers

Feedback Form 11: 2nd round of answers

1 – Fujitsu Limited

Answers to HuaWei Technologies Co., Ltd:

Q1: What power control enh do you think is the most important?

A1: Actually, we do not see strong motivation to enhance power control for sidelink. If enhancement is needed, the following may worth being considered, such as power control for groupcast/PSFCH, power control based on geographical information (position/distance).

Q2: Would the SL CA mentioned under SL-unlicensed also be applicable as a feature to non-unlicensed bands? Intra- and inter-band?

A2: Yes. In our view, CA can be a general feature not limited to SL-U. In the right figure of slide 3, CA is listed in parallel with SL-U, and SL-U is considered as prioritized. Under CA, we are open to both intra-band and inter-band.